

is the total elimination of after effect, provided this should introduce no other evil. It sometimes happens, however, that the elimination of Scylla widens the jaws of Charybdis, and a careful eye should be kept on other properties.

Professor Marvin apparently considers the laws evolved in my paper too complicated for practical use. This must depend partly upon the intelligence of the observer, as well as on the ability of the individual reducing the observation. By putting, however, the aneroid used in an ascent, or a similar one previously compared with it, through an analogous series of pressure changes in a receiver, it seems possible, as explained in my paper, to reduce very largely the uncertainty of the results. The difficulty of treating the results would be much reduced if the aneroid readings at all pressures were independent of the temperature.

By a printer's error, the date of my paper is given in Professor Marvin's account as 1895 instead of 1898.

#### CIVIL SERVICE EXAMINATIONS FOR OBSERVERS IN THE UNITED STATES WEATHER BUREAU.

By H. H. KIMBALL, Weather Bureau.

It has been my privilege to assist the Civil Service Commission in marking the papers on meteorology and the essays on meteorological subjects submitted at the regular semiannual examinations, April 27 and September 27, 1898, which were held in all parts of the country in order to obtain a list of eligibles for the position of "Observer, United States Weather Bureau." Judging from these examination papers, a majority of the applicants were already connected with the Bureau either as messengers, watchmen, voluntary observers, or in some other capacity that offers opportunity for obtaining practical knowledge in meteorology. It might, therefore, not be out of place to offer a few suggestions through the pages of the MONTHLY WEATHER REVIEW to those intending to take the examination at some future date.

While the relative standing of candidates depends very largely upon the percentages made in meteorology and essay writing, it should be remembered that the examination also embraces geography, penmanship, spelling, letter writing, copying, and arithmetic. It frequently happens that a passing grade is attained in the former, only to be reduced below the standard by failure in the latter subjects. The necessity of, at least, a very thorough common school, and, if possible, high school, education is therefore apparent.

Furthermore, without a thorough knowledge of the English language and the ability to use it, born only of experience, one can not hope to write a creditable essay, or to compose his answers to the questions in meteorology so clearly that the examiners will have no doubt as to his meaning.

The meteorological papers submitted enable us to group the writers into three quite distinct classes: First, those whose papers show evidence of thorough and careful preparation, and a consequent mastery of the subject. Second, those whose papers show little or no attempt at the necessary preparation. Thus, one poor fellow wrote out all he knew about *condensation* and *precipitation* in about ten words, and acknowledged that he had no time for study. Another described the *dew-point* as a *needle point of steel*, and determined it by the *rise and fall of the barometer*; and still another described a thunderstorm as a *burning up of the carbonaceous matter and surplus nitrogen of the air*.

The first class will get along very well without any suggestions, and we have none to make to the second class further than that they cultivate the studious habit.

The third, and perhaps the largest, class of applicants is composed of those whose papers bear evidence of ill-directed and unprofitable preparation. Apparently, considerable

reading had been done, and many scientific terms had been committed to memory without any clear conception as to their significance. In fact, most of the work done has been memory work, and even the elementary principles of meteorology have been left unmastered.

Such preparation might enable one to define a *foehn* wind or a *col*, but would hardly prepare one to distinguish between climate and weather.

To such we would say that the observer's examination in meteorology, while it aims to be elementary and practical, is quite comprehensive in its character, and a mastery of the elementary principles of the subject is essential. The study of high-sounding terms and theories that are more or less speculative need not be attempted by the applicant, but may be postponed to a later period of study. Thoroughness in first principles should be the watchword; master every inch of ground that is covered, even if you do not get beyond the most elementary of books. But be sure that book is up to date, for meteorology has developed greatly in the last twenty years.

In essay writing, it is a good rule not to attempt to write about that of which one has no knowledge. A candidate who admitted that he knew nothing about the arid region of the United States and, therefore, wrote about the weather at his old home, did more creditable work than a fellow competitor who described the arid region as *a good place for bears and other animals covered with wool; but, on account of numerous icebergs, it was not a good place for navigation, for the abode of man, or for vegetation*.

The element of chance in these examinations is very small. In one way or another, a man is sure to show just how much he knows. If, therefore, he is to compete successfully with his fellows, he must thoroughly understand the subjects upon which he is to be examined, and must say no more than he is sure of.

#### CLIMATE AND CROP REPORT, SEASON OF 1898, ALASKA SECTION.

By H. L. BALL, Section Director.

The District of Alaska is nearly or quite as large as that part of the United States east of the Mississippi River. The greater part of this vast territory lies between the one hundred and thirtieth and one hundred and sixty-sixth degrees of longitude, and the fifty-second and seventy-first parallels of latitude—or, its length lies along the parallels and not longitudinally, as is the case with the Eastern States. For climate and crop study two divisions may be made: the southern coastal region, and the interior, each characterized by extreme ruggedness, often inaccessibility, and having a different climate.

The sweep of the ocean current along the whole southern coast gives that section a more temperate and uniform climate than the interior, or than would otherwise be found in such high latitudes. The presence of this warm current and the peculiarly intricate mountain system of the coast line unite to produce a climate having comparatively small temperature range and an excessive precipitation. Where it is otherwise, and sometimes such is the case, local topographic features cause the difference.

Southeastern Alaska includes all the Alexander Archipelago. This section is a labyrinth of mountainous and heavily timbered islands interlaced with numberless narrow channels. The general trend of the mountains is parallel to the coast line. Meteorological records at Sitka fairly represent the general climatic conditions prevailing throughout the section, although there are localities that show variations which are only to be accounted for by peculiar local topography.

Northwest of the Alexander Archipelago is Yakutat Bay.

There the mountains are farther from the coast line and a dryer climate is had, with greater range of temperature and more sunshine. Still farther westward is Prince William Sound. This sound is dotted with a great number of islands, many of which attain considerable elevation. The coast of the mainland is precipitous and deeply indented by narrow arms. Here the climate appears to differ greatly from both the Yakutat country on the east, and Cooks Inlet which lies to the westward over the Kenai Peninsula. I know of no statistics of temperature or rainfall for Prince William Sound. Persons long resident there say that precipitation is almost of daily occurrence, especially during the summer months.

Three hundred miles southwest of Prince William Sound is Kadiak Island, and north of that island is Cooks Inlet, justly called the garden spot of Alaska. Cooks Inlet and Shelikoff Strait are narrow sheets of water lying between the mountainous Kenai Peninsula on the east, and the Alaskan Peninsula and the mainland on the west. In the inlet extensive table lands, having an elevation of 100 or more feet, stretch away from the water to the mountains, a distance of from 30 to 50 miles. Near the entrance to the inlet the mountains lie along the coast, and this is the case with the Shelikoff Strait, except that the mountains of Kadiak Island and Afognak are less rugged than the lower part of the Kenai Peninsula. Thus Cooks Inlet is a great basin inclosed by high mountains, except at the entrance. The Alaskan Peninsula and the Aleutian Islands become less rugged to the westward, trees disappear after Kadiak Island is passed, and the climate becomes purely marine.

The southern coastal region appears destined to take its proper place, at no distant date, as an agricultural region, certainly as a magnificent stock range. Other pursuits, such as mining, trading, and fishing, which yield quicker income to invested capital, have hitherto prevented all but a very few from attempting to develop the agricultural resources of the country. Gardening in a small way is about all that has been done, although it has long been believed, in fact known, that many of the hardier cereals and fruits can be successfully grown. That this has not been done is not because of an unfriendly climate.

At Sitka and other places in southeastern Alaska the past season was a remarkably good one, but by no means unparalleled. The winter rains ceased early. April and May weather was about as usual, that is, rains were light and frequent, with clear, bright days intervening and a gradual increase in temperature. The gardens of the Agricultural Experiment Station were planted during the latter part of May. By that time the ground held sufficient heat to insure prompt germination and by the close of the month the young vegetables, grain, and flax were well started. The first two weeks of July were remarkably dry and sunshiny. Little or no rain fell during that time and temperatures above 80° were noted on the 8th, 9th, and 10th. This period of fine weather, the warmest of the season, gave all the young plants a good start and the rapidity of their growth was truly wonderful. It is surprising with what rapidity plant life starts, develops, and attains an almost tropical luxuriance in Alaska. At Sitka, during the last half of June, 1.39 inch of rain fell, the maximum temperatures ranged between 56° and 70°, and upon but one day did the temperature fall below 45°. During July 3.97 inches of rain fell; the temperature ranged between 43° and 68°, with an average maximum of 60° and minimum of 49°. The greater part of the month's rainfall occurred between the 22d and the 26th, the first three weeks having 1.40 inch, evenly distributed as showers. The rainfall for August was 3.92 inches. Of this amount 3.11 inches fell during three days, the 22d, 27th, and 31st, the first three weeks having but 0.58 inch. The temperature ranged from

a minimum of 42° on the 28th to a maximum of 78° on the 10th, with average maximum 63° and average minimum 49°. The month had an abundance of sunshine and all the crops made excellent growth.

The early part of September was dry and warm, with many bright days. The first eleven days gave 0.48 inch of rainfall, and the temperature on the 9th and 10th reached 73° and 74°, respectively. After the 11th, winter types of storms appeared, barometric fluctuations were more irregular and rapid and of greater amplitude, while rainfall was of almost daily occurrence. On the 18th and 19th the skies cleared and heavy frosts fell, however, without damage to the garden vegetables; 5.98 inches of rain fell during the month; the range of temperature was from 33° on the 19th to 74° on the 10th, with average maximum of 59° and average minimum 45°. October opened clear, cool, and bright, and this weather continued until the 6th; a fitting prelude to the continuously stormy weather which followed. Heavy frosts fell on the 1st and 2d, and killing frosts on the 3d, when the ground froze slightly. These frosts killed what was left of the gardens and destroyed the buckwheat seeded by the Agricultural Experiment Station. This crop was, however, sown late, otherwise it would have matured before the frosts.

The vegetables and grains seeded in the latter part of May at Sitka have all done remarkably well, in fact many of the former grew better than they do in the central States, and the clover produces a heavy crop. Barley and oats seeded on the 23d of May matured plump and heavy seed by the 25th of September. Canada field peas produced vines 10 to 12 feet long, loaded with pods. The English Windsor bean, a vegetable that is not appreciated at its true value in the States, grew 4 feet high, bearing an abundance of pods. In like manner cabbage, cauliflower, carrots, parsnips, turnips, parsley, radish, lettuce, beets, and in fact everything that was attempted grew to perfection.—*Prof. C. C. Georgeson.*

At Killisnoo, during May, 2.90 inches of rain fell. The temperature ranged from a minimum of 32°, on the 2d, to a maximum of 55°, on the 14th and 15th, with an average maximum of 57° and minimum of 37°. Very little rain fell until the 17th; after that date light rains were frequent until the 29th, and little or no sunshine occurred. For June the voluntary observer reported 1.05 inch of rain, the whole of which fell on four days. The temperature ranged from 35° on the 2d, to 69° on the 15th, with an average maximum of 62°, minimum 43°, and 7 clear, 10 partly cloudy, and 13 cloudy and rainy days. During July 4.30 inches of rain fell; of this amount 0.80 inch fell during the first seventeen days, the remainder falling between the 18th and the 26th. Maximum temperature for the month, 69°, on the 9th; minimum, 44°, on the 29th. Average maximum, 62°; minimum, 48°. For August the same observer reported 1.30 inch of rainfall, the whole of which fell after the 22d of the month. Highest temperature, 71°, on the 9th; lowest, 41°, on the 7th. Average maximum, 64°; minimum, 47°. There were 9 clear days, 11 partly cloudy, and 11 cloudy and rainy. The gardens yielded fully as well as at Sitka. In the latter part of September I saw as fine potatoes there as I ever saw in the States. Though not as large as some grown in the States, they were of excellent marketable size, well formed, and plenty in the hill.

In western Alaska, along the coast and in Cooks Inlet, the season was the most unfavorable in many years. Many long-resident Russians and all the Americans, some of whom have resided in the country ten or more years, said they had never before seen so much rain and so little sunshine as during the past summer. May, June, and the first half of July were, as usual, favorable months, but rainstorms set in about the 20th of July, and from that time onward there were but few pleasant and many cold, rainy days. In Prince William Sound the whole summer was wet and cold, with now and then a clear

or partly-cloudy day. On August 16, at Orca, I observed snow-flakes flying. Little or no systematic attention is given to gardening in the Sound. At Orca a small garden of radishes, turnips, and like root crops had been planted, but the yield was miserably poor. At Kadiak the gardens in the early part of July were in a very flourishing condition; potatoes and other vegetables had a splendid growth. Kadiak Island and the other islands of that group were covered waist deep with luxuriant grasses and flowers of many varieties. The traveler is struck with amazement at the floral wealth of that country, which, though comparatively treeless, offers thousands of miles of pasture unsurpassed by any State in the Union. The plateaus of Cooks Inlet, too, were covered with long, rich grasses, many kinds of which make excellent food for cattle. At Kenai, Kussiloff, Ninilchek, Anchor Point, and Homer, all on the east side of the Inlet, gardens had been planted, and at each place the yield was good, but was said to be poorer than usual, on account of the unfavorable weather during the latter part of the summer. At Kenai and Ninilchek I saw cattle which had probably never tasted grain; yet they were fat and healthy.

The woods and meadows of that country abound with berries of many varieties, all having an excellent flavor. Fuel, both coal and wood, can be had without asking, and fish and game are abundant. The soil is easily cleared, yields quickly and bountifully, with a minimum amount of labor, and there are few or no harmful vegetable insects. During a stay of several weeks in the Inlet this past summer I did not once observe a higher barometer reading than 29.92 inches, while outside the Inlet I frequently observed readings of 30.00 and higher. The winds were either southwest or northeast, up or down the Inlet. The few opportunities I had for observing the movement of cirrus clouds showed them as coming from the southwest.

The chief hindrance to the early and thorough settlement of that country appears to be its great distance from markets, its isolation during a large part of the year, and the mosquitoes and sand flies during the summer months; mosquitoes are a pest beyond description. One who has never been in the country can form no idea of the annoyance they cause,

both night and day. Of course, with the clearing of the land this pest would disappear to a great extent.

At Tyoonok and Ladds, on the west side, gardening is more extensively engaged in than at any other point in the Inlet. It was said that usually the potato crop is ripe by the 4th of July, and that it yields well. This year the crop was not of eatable size by the first of August, and did not promise to be a good one. Rains and cloudy weather prevailed throughout July and August, and frequently the days were raw and cold.

At Coal Harbor, on Unga Island, about three hundred miles southwest of Kadiak, the voluntary observer's report for August showed 2.25 inches of rainfall, with 3 clear or partly cloudy days, and 28 cloudy and rainy days. The range of temperature was from 43° to 60°. For September the same observer reported 1.02 inch of rainfall, with 7 clear, 8 partly cloudy, and 15 cloudy and rainy days. Maximum temperature, 66° on the 12th; minimum, 34° on the 27th and 28th. Records from that station for previous months have not been received.

The only meteorological records received from the interior were those from Holy Cross Mission (Kosereffsky) on the Yukon. At that place 33 inches of snow lay upon the ground at the close of April. In May the total precipitation was 0.20 inch, with 5 clear, 16 partly cloudy, and 10 cloudy and rainy days. The highest temperature for the month was 58° on the 28th; the lowest, 15° on the 9th. For June the rainfall was 2.09 inches, with 8 clear, 14 partly cloudy, and 8 cloudy and rainy days. Maximum temperature, 76° on the 11th; minimum, 53° on the 3d, with average maximum and minimum of 67° and 45°, respectively. During July 3.34 inches of rain fell. There were 9 clear, 7 partly cloudy, and 15 cloudy or rainy days. Highest temperature, 80° on the 15th; lowest, 40° on the 29th. Average maximum, 65°; minimum, 48°. For August the record gives 2.96 inches of rainfall, with 1 clear, 8 partly cloudy, and 22 cloudy or rainy days. Maximum temperature, 68° on the 22d; minimum, 37° on the 7th and 30th, with averages of 61° and 47° respectively. For September 2.43 inches of rain were reported. Clear days, 3; partly cloudy, 11; cloudy, 16. The first snow of the season fell on the 21st. Maximum temperature for the month, 60° on the 1st; minimum, 25° on the 23d and 24th.

## NOTES BY THE EDITOR.

### CAPT. MICHAEL MAHANY.

A large majority of the observers and officials of the Weather Bureau will, with regret, learn of the death of Captain Mahany at Washington, on February 3, 1899. For many years during the existence of the school of instruction in signaling and meteorology, at Fort Myer (formerly Fort Whipple), Va., Captain Mahany was the first sergeant, and as such, came into intimate daily contact with every member of the successive classes under instruction. His special attention was given to the care of the men, and their quarters and their instruction in military drill and signaling. He was emphatically and naturally a soldier, and was an excellent drillmaster; although a strict disciplinarian, he was thoroughly faithful to the best interests of those entrusted to his care, and no superior officer ever thought of replacing him by another. When the meteorological, was separated from the military, service, Captain Mahany cast his lot in with the former, and when Professor Moore was appointed Chief of the Weather Bureau, he soon showed his appreciation of the merits of his former drillmaster by recommending him for appointment to the very responsible position of Captain of the Watch, which position he filled with marked acceptability.

He will be sadly missed by every one. He was a prominent member of "The Old Guard," and was buried at Arlington with military honors.

### REDUCTION TO STANDARD GRAVITY.

In the MONTHLY WEATHER REVIEW for July, page 314, we have explained the process by which we pass from crude barometric readings at any station to the true atmospheric pressure expressed either in inches, as the height of a column of mercury or, still better, in pounds to the square inch, as pressures are more appropriately measured. One step in this process consists in applying the reduction to standard gravity. Now, the reduction to standard temperature has been acceded to and practiced for the past sixty years; but the reduction to standard gravity has been applied only in special cases, and its general application has been delayed until there could be a concert of action among all nations. Its importance and magnitude has been recognized ever since Laplace published his *Mécanique Céleste*. The international congresses of Vienna, 1873; Rome, 1878; Munich, 1891; as well as the Permanent International Meteorological Committee, have